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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,465	02/15/2005	Akiyoshi Fujii	1248-0769PUS1	4838

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EXAMINER

DOLAN, JENNIFER M

ART UNIT	PAPER NUMBER
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2813

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/524,465

Applicant(s)

FUJII ET AL.

Examiner

Jennifer M. Dolan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 10,11 and 13-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 12 is/are rejected.
- 7) ☒ Claim(s) 8 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/15/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-9 and 12, in the reply filed on 28 February 2007 is acknowledged. Claims 10, 11, and 13-29 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear as to whether the drop-on position is on the branching-off section or on the channel section, and exactly what is meant by the last 3 lines of the claim. For the purpose of examination, it is assumed that the droplets are applied on the branching-off section

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 6, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S.

Patent No. 6,545,291 to Amundson et al.

Regarding claims 1, 2, and 12:

As the claims are directed to a thin film transistor device, per se, the method limitations appearing in lines 7-8 of claim 1, the entirety of claim 2, and lines 9-10 of claim 12 have only been accorded weight to the extent that they affect the structure of the completed thin film transistor. Note that "determination of patentability in 'product-by-process' claims is based on product itself, even though such claims are limited and defined by process [i.e., formation of the source/drain electrodes by application of a droplet of electrode raw material, application of a droplet at a specific location], and thus product in such claim is unpatentable if it is the same as, or obvious form, product of prior art, even if prior product was made by a different process", *In re Thorpe, et al.*, 227 USPQ 964 (CAFC 1985). Furthermore, note that a "product-by-process claim, although reciting subject matter of claim in terms of how it is made [i.e., applying a droplet on the branching-off or channel sections] is still product claim; it is patentability of product claimed and not recited process steps that must be established, in spite of fact that claim may recite only process limitations", *In re Hirao and Sato*, 190 USPQ 685 (CCPA 1976). For the purpose of examination, any TFT structures having source/drain electrodes with material properties such that they are capable for formation by droplet deposition are considered to meet the limitations of the claims. Regarding claim 2, the specific location of the droplet application is not considered to affect the properties of the claimed product.

Regarding claims 1, 2, and 12, Amundson discloses a liquid crystal display device (column 1, lines 25-30; column 12, lines 12-15) comprising a thin film transistor, wherein the thin film transistor comprises a semiconductor layer (150) facing a gate electrode (110) via a gate insulation layer (140; see figure 2A), a source and drain electrode (120 and 130) that are electrically connected with the semiconductor layer (column 9, lines 45-50; figure 2A), and a channel between the source and drain electrode (column 9, lines 45-50), wherein: the source and drain electrode are formed using materials consistent with a droplet deposition method (Amundson actually teaches application of a droplet of an electrode raw material - column 10, lines 17-45, column 11, lines 30-55, noting that inkjet printing necessitates application of a droplet of raw material), the electrodes having a branch section at branching off parts thereof located off a forming area of the semiconductor layer (see figures 5A, 5B, noting that semiconductor layer 130 extends to and beyond the data line 330), the branch section including a plurality of branch electrodes, at least part of which are in a forming area of the semiconductor layer (also see figures 5A, 5B; the “finger” portions of the source and drain electrodes must extend over the semiconductor layer), the branch electrodes being alternately arrayed (see figure 5A).

Regarding claim 3, Amundson discloses that each branch electrode has parallel parts within the forming area of the semiconductor layer, and that each branch electrode is linear between the parallel part and branching off parts (see figure 5A).

Regarding claim 6, Amundson discloses that the channel section width is not longer than a length of the branching electrode sections (see figure 5A).

6. Claims 1-3 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Publication No. 2003/0059984 to Sirringhaus et al.

Regarding claims 1, 2, and 12, as the claims are directed to a thin film transistor device, per se, the method limitations appearing in lines 7-8 of claim 1, the entirety of claim 2, and lines 9-10 of claim 12 have only been accorded weight to the extent that they affect the structure of the completed thin film transistor in a manner substantially similar to that in the rejection supra. Sirringhaus discloses a liquid crystal display (paragraphs 0160-0161) having a TFT, the TFT including: a semiconductor layer (4) which faces a gate electrode (6) via a gate insulation layer (5); source and drain electrodes (2, 3) electrically connected with the semiconductor layer (paragraph 0074; figure 1C); and a channel section between the source and drain electrodes (figure 1C, paragraph 0076), wherein: the source and drain electrodes are formed with a material consistent with droplet deposition (paragraph 0074, note that Sirringhaus actually teaches droplet deposition through ink-jet printing of the source and drain electrodes) and have a branch section at branching off parts located off of a forming area of the semiconductor layer (see figure 6), the branch section including a plurality of branch electrodes in the forming area of the semiconductor layer, the branch electrodes of the source and drain being alternately arrayed, linear, and parallel (figure 6; paragraph 0166).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amundson et al. in view of U.S. Patent Publication No. 2002/0145144 to Kane et al.

Amundson fails to disclose that a part of the source or drain electrode between the branching off part and the end gets wider toward the forming area of the semiconductor layer, or that a gap between adjacent electrodes gets wider as the electrode is extended toward the channel section from the branching-off parts.

Kane teaches a configuration wherein one of the source/drain electrodes has a portion that gradually widens extending from an end to the branching off part (noting that the entire end portion extends over the forming area of the semiconductor layer; see figures 2 and 4), thus forming a gap between adjacent electrodes that gets wider extending toward the channel from the branching off parts (see figures 2 and 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the shape of the interdigitated source/drain electrodes of Amundson, such that they include the widening geometry suggested by Kane. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide the geometry taught by Kane, because Kane shows that such a geometry is suitable for a high performance TFT device (Kane, paragraphs 0007), and contributes to the reduction of gate-to-pixel capacitance (Kane, paragraph 0007) as well as to the accurate control of the resistance of the TFT (Kane, paragraph 0025).

Allowable Subject Matter

9. Claims 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for allowability is the limitation of forming the semiconductor layer in a substantially circular pattern, in addition to the other limitations in the claims. The closest prior art of record, including the prior art drawn toward liquid printing of semiconductor materials for TFTs, still generally teach formation of the semiconductor region in rectangular or stripe shaped bodies. The prior art provides neither the suggestion nor the motivation for forming such a layer in a circular shape. Since use of a circular shape eliminates the need for additional patterning steps or droplet confining structures, it is the Examiner's opinion that the claimed shape goes beyond the scope of a mere design choice.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 2005/0071969 to Sirringhaus et al., US 2003/0117362 to An, US 2002/0093474 to Toyoshima et al., US 2001/0043292 to Tsujimura et al., and US 6,157,048 to Powell teach TFT structures having various interdigitated source/drain electrode configurations.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer M. Dolan
Examiner
Art Unit 2813

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